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Virtual Test Bed

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LONG-TERM GOALS

The primary goal of this project is to develop a benchmark system for evaluating models for predicting the characteristics of ocean wind waves.

SCIENTIFIC OBJECTIVES

A Benchmark System will be extremely valuable in the objective selection of models for various applications, improve our understanding of state-of-the-art capabilities, and help prioritize future R&D directions in this field.

APPROACH

This effort is partitioned into two primary phases, one dealing with generation-scale models (i.e. the models which treat the physics of wave generation, propagation, and decay in a basin) and another dealing with transformation-scale models (i.e. models which treat the physics of waves propagating from offshore areas into the coastline). Each phase is further divided into three parts:

      1) assembly of field and laboratory data sets for testing;
      2) set-up of a benchmark system; and
      3) exercising the benchmark system for selected models.

WORK COMPLETED

To date, the main effort on this project have been directed toward coordinating the assembly of data sets for testing, with a secondary effort directed toward establishing a computer-based, automated benchmark system. Two related issues are the selection of the events/time periods to be included within the test bed and the choice of statistical measures/overall metrics to be used in model evaluations. Preliminary event/time periods have been selected in conjunction with Dr. Vince Cardone of Oceanweather and a set of standard statistical measures is now being assembled for inclusion in the test bed.

Data sets for generation-scale wave model testing, including existing buoy and satellite data, are beginning to be assembled within the virtual test bed. Wind fields for running these tests will be obtained from Oceanweather, Inc. from a separate ONR contract. Data sets for transformation-scale testing are presently being selected from measurements around the world.

Work on the construction of the actual computer-based test bed was temporarily discontinued when it appeared that Delft Technical University might be able to supply this software. A decision of whether or not to continue ONR's funding of CHL to do this is pending.

RESULTS

Available measurements appear to provide sufficient information to obtain a very good "first-cut" assessment of models. Much of the first two years of this effort have been devoted to coordinating with other groups (Delft Technical University, Oceanweather, NRL-Monterey) and on building the foundation for an good integrated effort in this area. This is now complete and we are now beginning the actual test-bed implementation.

IMPACT

The data sets and methods derived from this project will help us gain a much improved understanding of the state-of-the-art in wave modeling and will help direct future research in this area.

TRANSITIONS

Results from this study will be used extensively in determining appropriate models (and their limits of applicability) for future DoD wave prediction efforts.

RELATED PROJECTS

This project is closely coordinated with ongoing model testing efforts within the U.S. Army Engineer Coastal and Hydraulics Laboratory, the U.S. Navy Research Laboratories in Stennis, Mississippi and Monterey, California, and the National Oceanographic and Atmospheric Administration.